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## An analysis of mathematics curriculum at secondary level

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### Abstract

The aim of this study is to analyze the Mathematics teachers' opinions about secondary education mathematics program (9-12 classes) which has been applied since 2005-2006 academic year by Ministry of Education. The study group of this research is 28 mathematics teachers who have already graduated and still make their profession at different educational institutions. To analyze the opinions gathered from prospective teachers' descriptive method is used. According to the findings of research the deficiencies and mistakes are emphasized. Suggestions for improving the secondary education mathematics programme are offered.

**Keywords:** Mathematics lesson, secondary education Mathematics program, Mathematics teacher, teacher opinion

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### 1. Introduction

Mathematics curriculum at primary level, which was prepared in 1983, was accepted with the name of Primary Education Mathematics Curriculum by means of the decision taken by Turkish Education Board in 1998 (Delil and Güleş 2007). At the beginning of 2004–2005 educational year, primary education mathematics curriculum was renewed in line with the constructivist educational approach, which is based on a student-centered understanding while the curriculum started to be implemented at the II. Level during the 2006-2007 educational year.

Mathematics curriculum, weight and teaching process and high level mental skills and innovation to bring a positive direction, gains, earnings between the pattern. To that positive direction, and innovation, in the pattern between gains to delta measurement and evaluation activities in terms of problem-solving skills deficiencies (Baykul

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2005) and were stated that there could be problems because of crowded classes, positive relation between, work load of teachers, using technology, the class of problems due to physical conditions and lack of knowledge of teachers in the implementation of the curriculum (Özdaş, Tanışlı, Köse ve Kılıç, 2005). (Akt. Ünsal 2013)

### *1.1 The Vision of the Curriculum*

It is stated that mathematics, which is described as the science of patterns and systems, fosters abstract and quick thinking as well as creative and aesthetics development; in other words, mathematics plays a crucial role in bringing up people needed by the knowledge society (Baykul, 2005).

It depends on the main idea called as «All children can learn mathematics.» However, the concepts related to mathematics, which is abstract, are needed to be gained through concrete activities or fictionalized life models. The idea that «learning mathematics is a rich and comprehensive process» is adopted within the curriculum. When considered from this point of view, it should be emphasized that it is important and necessary to bring up individuals who can use mathematics in their lives, solve problems, share their solutions and ideas, work co-operatively, have self-confidence about mathematics and develop positive attitudes towards mathematics (Delil and Güneş, 2007).

### *1.2. Aim of The Study*

This study aims to analyze the views of mathematics teachers about mathematics curriculum at secondary level which has been implemented since 2006-2007 educational year in terms of the goals of mathematics curriculum at secondary level as well as the activities determined to reach the pre-determined goals and the dimension of assessment and evaluation. This study also includes some suggestions related to the received data for researchers in order to contribute to the development of the curriculum.

## **2. Method**

### *2.1. Research Model*

This study is a descriptive research as it aims to display the current situation exactly while qualitative research pattern has been used to carry out this study.

### *2.2. Study Group*

The method of easily accesible sample has been used in this study. 28 volunteering teachers who work at various state schools have participated in the study.

- Nine of the teachers have expressed their views related to the curriculum of 9th grade,
- Seven of the teachers have expressed their views related to the 10th grade,
- Six of the teachers have expressed their views related to the 11th grade,
- Six of the teachers have expressed their views related to the 12th grade.

### *2.3 Data Collection*

As the data have been collected through the method of interview, «semi-structured interview form» has been used. Expert opinion has been made use of for the validity and reliability of this form. The data have been analyzed by two researchers and the findings have been described in detail.

### *2.4. Analysis of Data*

The data received through interviews have been interpreted by means of carrying out content analysis. The similar data have been gathered within the framework of basic concepts and categories while they have been interpreted by two different people after being organized meaningfully. Some of the interviews have been quoted in order to support the interpretations.

## **3. Results**

As a result of the findings gathered at the end of the study, the main themes have been determined to be; The basic philosophical approach on which the curriculum is based, learning approach, setting the goals, educational status and evaluation.

### *The Basic Philosophical Approach on Which the Curriculum is Based*

The teachers have stated a common view that mathematics curriculum at all grades are based on the philosophy of progressivism. The educational philosophy of progressivism can be described as the approach of pragmatism reflected upon and adopted to education. Change is accepted to be the core of reality within pragmatism.

### *Learning Approach on Which the Curriculum is Based*

All the teachers have expressed that mathematics curriculum at all grades are based on the learning approach of «constructivism.» Constructivism means that knowledge is constructed mentally by the learner. When the learner integrates the previous knowledge with the new one, a meaningful learning comes out. As Ersoy stated previous education programs which were prepared by The Ministry of Education adopted and stereotyped behavioral approach, but general framework and structure with elements of cognitive science approach, point of view, expectations and processes have been preferable, in this context, content coerce the learning areas some arrangements have been made.

Learning at each grade level and subject being tracked in a conceptual approach, the development of mathematics concepts and relationships are highlighted, sample handling issues is an attempt to reflect on the ideas mentioned. Conceptual approach, as it is known, to the creation of the conceptual foundations of mathematics-related information to allocate more time; thus establish relations between conceptual and procedural knowledge is required. Students effectively doing the math problem solving, solutions and share their thoughts, they also learn to relate to other areas

### *Setting the Goals*

The goals of the mathematics curriculum at 9th, 10th, 11th and 12th grades are mostly at the level of perception. Goals addressing implementation as well as perception are also included in the curriculum. The teachers who have examined the curriculum at each grade have expressed that some of the goals are at the level of perception and implementation simultaneously and they have added that this does not comply with the principle of writing a goal which prescribes that:

*“The goals should be comprehensive but also limited at the same time. While the goals should express a group of behaviors on one side, they should also refer to a single quality on the other side.»*

### *Arranging the Educational Status*

The general view related to each grade states that the goals are mostly in compliance with the activities, however the number of activities and examples are not sufficient. The examples should have a nature that improves students' imagination. According to the teachers, while the examples are few in number, they are clear and understandable. The activities should be prepared in line with the implementation and daily life. Teacher D3 emphasize it as;

*“The subjects should be associated with the daily life and they should be dealt more concretely and joyfully.”*

The overall objective of mathematics courses, where students not only to provide information to recite the developed program to support literacy learning in the field of mathematics are provided. These learning areas involve basic math concepts, transaction information and rules, contains elements of mathematical language, etc. Mathematical thinking, reasoning and forecasting, problem solving, attitudes, values which are necessary for mathematical literacy were taken into account, as well as other skills. In particular, making a prediction and approximate calculation is different than in previous curriculum (Ersoy 2006).

### *Evaluation and Assessment*

It is emphasized that evaluation should focus on implementation rather than memorization. In general, the teachers have expressed that the dimension of evaluation and assessment has deficits and it should be improved. Teacher I5: *“Evaluation should eliminate the problem of ‘Where will we use it?’»*

Evaluation process should prevent the question “what will it work for?” Evaluation shouldn’t assess memorizing, it should assess applicable information.

#### 4. Discussion

The updated curricula are taking serious steps about supporting students’ multi-dimensional development and establishing the infra-structure of transfer from «passive learner» to «active learner» in society. It has been emphasized and suggested that during student-centered activities of teaching mathematics, concrete and cognitive means should be used in visualizing mathematical concepts and ensuring them to be understood, in deepening learning and using what is learnt in solving real-life problems.

As mathematical concepts are interrelated with each other through a tight relation of prerequisite, it is necessary to carry out studies of evaluation such as oral and written exams, observations, discussions, interviews, presentations, experiments, exhibits, projects, files of development and improvement, self-evaluation, peer-evaluation in order to prevent the malfunctions that may arise (Delil and Güneş, 2007). It is important to integrate different methods of evaluation in order to ensure that the curriculum is implemented successfully.

#### 5. Suggestions

It is more important to adopt and implement the curriculum than to develop it. And this require patience and effort of all the shareholders of education. In the following studies, the curriculum at each grade can be analyzed separately and thus more detailed data can be gathered. The results can be supported by means of receiving the opinions of curriculum development specialists as well as teachers’ opinions related to mathematics curriculum. Data related to the mistaken or insufficient aspects of the curriculum can be gathered by means of receiving students’ opinions about how mathematics lessons are implemented. A comprehensive study of “curriculum evaluation» can be carried out.

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